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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/399,911	07/09/2001	Toshihiko Aoki	109965	4494

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ALEXANDRIA, VA 22320

EXAMINER

SOHN, SEUNG C

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 01/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/899,911

Applicant(s)

AOKI, TOSHIHIKO

Examiner

Seung C. Sohn

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 & 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: " scale 5" in Fig. 9 as disclosed on Page 11 at various places. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. ***Claims 1-2 and 4-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Lambeth (Patent No. US 4,521,106).***

Referring to claim 1, Lambeth shows in Figs. 3 & 4 the following elements of Applicant's claim:

a) a substrate (Fig. 4, 38, i.e., p-type silicon substrate) (Col. 5, lines 11-13); and

b) a plurality of photosensitive devices (22, photodiodes) certain pitch, formed with semiconductor layers deposited on said substrate, and isolated from each other (by 42', channel stopping region) (Col. 5, lines 20-23).

Referring to claim 2, Lambeth shows in Figs. 2 & 3 that said plurality of photosensitive devices (22) configures a photosensitive device array arranged one-dimensionally (Col. 4, line 56).

Referring to claim 4, Lambeth shows in Fig. 2 a scanning detector (34, output diode) for sequentially scanning output signals from said plurality of photosensitive devices to detect a light spot position (Col. 5, lines 1-6).

Referring to claim 5, Lambeth shows in Fig. 1 that an output signal line commonly connected to terminal electrodes of said plurality of photosensitive devices; and a detection circuit connected to said output signal line, wherein a light spot is radiated as a light pulse to determine a light spot position from a delay time of a detection output from said detection circuit after said light pulse irradiation (Col. 1, lines 47-66).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lambeth (Patent No. US 4,521,106) in view of Aoki (Application Publication No. JP 2001-50778).

Referring to claim 3, Lambeth disclose as above, but does not disclose that said plurality of photosensitive devices includes a first photosensitive device array arranged on said substrate along a first axis; and a second photosensitive device array arranged on said first photosensitive device array with an interlayer insulator therebetween, along a second axis different from said first axis. Aoki shows in Fig. 5 that said plurality of photosensitive devices includes a first photosensitive device array (51a) arranged on said substrate along a first axis; and a second photosensitive device array (51b) arranged on said first photosensitive device array with an interlayer insulator therebetween, along a second axis different from said first axis (Paragraphs 0028-0031). It would have been obvious to a person having ordinary skill in the art to provide the photodetector array of Aoki in the device of Lambeth for the purpose of receiving transmitted light through spaces between first photodetector array (Paragraph 0030).

6. Claims 6-7, 9-15 and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakubo et al. (Patent No. US 5,671,052) in view of Lambeth (Patent No. US 4,521,106).

Referring to claim 6, Kawakubo et al. shows in Fig. 13 the following elements of Applicant's claim:

a) a scale (135) having scale markings formed along a measurement axis
(Col. 7, lines 54-55);

b) a sensor head (lower part of the Fig. 13b) movably arranged relative to
said scale (135) along said measurement axis for reading said scale markings
(Col. 7, lines 40-51); and

c) a state detection system (133 & 134) mounted on said sensor head for
optically detecting a relative positional state of said sensor head to said scale
(135) (Col. 1, lines 51-58).

Kawakubo et al. does not disclose that said state detection system contains a
light spot position sensor including a substrate; and a plurality of photosensitive devices
arrayed at a certain pitch, formed with semiconductor layers deposited on said
substrate, and isolated from each other. Lambeth discloses a substrate (Fig. 4, 38, i.e.,
p-type silicon substrate) (Col. 5, lines 11-13); and a plurality of photosensitive devices
(22, photodiodes) certain pitch, formed with semiconductor layers deposited on said
substrate, and isolated from each other (by 42', channel stopping region) (Col. 5, lines
20-23). It would have been obvious to a person having ordinary skill in the art to provide
image sensor of Lambeth in the device of optical encoder of Kawakubo et al. instead of
photodetector (134) for the purpose of getting higher signal to noise ratio under low light
operating conditions (Col. 3, lines 58-62).

Referring to claim 7, Lambeth shows in Figs. 2 & 3 that said plurality of
photosensitive devices configures a photosensitive device array arranged one-
dimensionally (Col. 4, line 56).

Referring to claim 9, Lambeth shows in Fig. 2 a scanning detector (34, output diode) for sequentially scanning output signals from said plurality of photosensitive devices to detect a light spot position (Col. 5, lines 1-6).

Referring to claim 10, Lambeth shows in Fig. 1 that an output signal line commonly connected to terminal electrodes of said plurality of photosensitive devices; and a detection circuit connected to said output signal line, wherein a light spot is radiated as a light pulse to determine a light spot position from a delay time of a detection output from said detection circuit after said light pulse irradiation (Col. 1, lines 47-66).

Referring to claim 11, Kawakubo et al. shows in Fig. 13 that said state detection system further includes a light source (133) arranged on said sensor head for providing a light beam entering said light spot position sensor via said scale (135) (Col. 7, lines 44-45).

Referring to claim 12, Kawakubo et al. shows in Fig. 13 that said state detection system further includes a state detection means for detecting a tilt of said sensor head to said scale based on a light spot position detected at said light spot position sensor (Col. 7, lines 44-45).

Referring to claim 13, Kawakubo et al. shows in Fig. 13 that said light spot position sensor detects rotations in a parallel plane between said sensor head and said scale based on detection of interference fringes (Col. 5, lines 18-25).

Referring to claim 14, Lambeth shows in Figs. 3 & 4 the following elements of Applicant's claim:

- a) a cantilever (lower part of the Fig. 13b) arranged opposite to a work (135, i.e. scale) to be measured and movable along a surface of said work without contacting said work;
- b) a photodetector (134) mounted on the tip of said cantilever; and
- c) a light source (133) mounted on the tip of said cantilever for providing a light beam entering said light spot position sensor via said work.

Kawakubo et al. does not disclose a light spot position sensor including a substrate; and a plurality of photosensitive devices arrayed at a certain pitch, formed with semiconductor layers deposited on said substrate, and isolated from each other. Lambeth discloses a substrate (Fig. 4, 38, i.e., p-type silicon substrate) (Col. 5, lines 11-13); and a plurality of photosensitive devices (22, photodiodes) certain pitch, formed with semiconductor layers deposited on said substrate, and isolated from each other (by 42', channel stopping region) (Col. 5, lines 20-23). It would have been obvious to a person having ordinary skill in the art to provide image sensor of Lambeth in the device of optical encoder of Kawakubo et al. instead of photodetector (134) for the purpose of getting higher signal to noise ratio under low light operating conditions (Col. 3, lines 58-62).

Referring to claim 15, Lambeth shows in Figs. 2 & 3 that said plurality of photosensitive devices configures a photosensitive device array arranged one-dimensionally (Col. 4, line 56).

Referring to claim 17, Lambeth shows in Fig. 2 a scanning detector (34, output diode) for sequentially scanning output signals from said plurality of photosensitive devices to detect a light spot position (Col. 5, lines 1-6).

Referring to claim 18, Lambeth shows in Fig. 1 that an output signal line commonly connected to terminal electrodes of said plurality of photosensitive devices; and a detection circuit connected to said output signal line, wherein a light spot is radiated as a light pulse to determine a light spot position from a delay time of a detection output from said detection circuit after said light pulse irradiation (Col. 1, lines 47-66).

Referring to claim 19, Kawakubo et al. shows in Fig. 13 that a detection means for detecting a surface feature of said work based on a position of said light beam detected at said light spot position sensor, said light beam output from said light source and entering said light spot position sensor via said work (Col. 7, lines 44-45).

Referring to claim 20, Lambeth shows in Fig. 1 that a displacement device arranged on said cantilever for displacing the tip of said cantilever in the direction opposite to said work; a displacement control means for feedback controlling said displacement device so that a position of said light beam detected at said light spot position sensor always comes to a constant position, said light beam output from said light source and entering said light spot position sensor via said work; and a detection means for detecting a surface feature of said work based on a feedback signal from said displacement control means to said displacement device (Col. 1, lines 43-66).

Referring to claim 21, Lambeth shows in Fig. 1 that a displacement device arranged on said cantilever for displacing the tip of said cantilever in the torsion direction of said cantilever; a displacement control means for feedback controlling said displacement device so that a position of said light beam detected at said light spot position sensor always comes to a constant position, said light beam output from said light source and entering said light spot position sensor via said work; and a detection means for detecting a surface feature of said work based on a feedback signal from said displacement control means to said displacement device (Col. 1, lines 43-66).

7. Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakubo et al. (Patent No. US 5,671,052) in view of Lambeth (Patent No. US 4,521,106) and Aoki (Application Publication No. JP 2001-50778).

Referring to claims 8 and 16, the modified device of Kawakubo disclose as above, but does not disclose that said plurality of photosensitive devices includes a first photosensitive device array arranged on said substrate along a first axis; and a second photosensitive device array arranged on said first photosensitive device array with an interlayer insulator therebetween, along a second axis different from said first axis. Aoki shows in Fig. 5 that said plurality of photosensitive devices includes a first photosensitive device array (51a) arranged on said substrate along a first axis; and a second photosensitive device array (51b) arranged on said first photosensitive device array with an interlayer insulator therebetween, along a second axis different from said first axis (Paragraphs 0028-0031). It would have been obvious to a person having

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ordinary skill in the art to provide the photodetector array of Aoki in the modified device of Kawakubo for the purpose of receiving transmitted light through spaces between first photodetector array (Paragraph 0030).

Conclusion

8. Claims 1-21 are rejected.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seung C. Sohn whose telephone number is (703) 308-4093. The examiner can normally be reached on Monday through Friday from 8:30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SCS

SCS
January 11, 2003


Kevin Fyo
Primary Examiner